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Architecture vs. ecosystem perspectives: Reflections on digital innovation

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1. Introduction

Digital technologies have transformed the ways and means of innovation in a wide swath of industries and sectors in our economy. Organizations, big and small and established and new, have initiated efforts to incorporate such digital innovation (Nambisan, Lyytinen, Majchrzak, & Song, 2017; Yoo, Henfridsson, & Lyytinen, 2010) as a cornerstone of their value creation and capture strategy. In the last several years, a rich stream of research that spans multiple fields (including information systems, strategy, operations, economics, and entrepreneurship) and incorporates diverse concepts and phenomena (including platforms and ecosystems) has evolved to examine the nature and impacts of digital innovation. Admittedly, this ongoing discourse on digital innovation still lacks a shared vocabulary, a coherent set of theoretical frameworks, and hence the requisite conceptual and theoretical tools to develop a deeper understanding of the specific ways by which digital technologies shape innovation, in terms of both processes and outcomes. Henfridsson and his colleagues' (2018) effort, in proposing a value spaces framework to analyze value creation and capture in digital innovation, should be seen in this light and is much welcome.

Among the many ideas and concepts suggested in this article, two need to be highlighted. First, the authors direct our attention to *digital resources*—or, digital components (Yoo et al., 2010)—and, note that such a focus increases the "granularity by which the creation and capture of value can be studied in digital innovation". This is a worthy point that needs repeating as it emphasizes the contingent nature of the relationships of digital resources with other resources, and thereby, the dynamic set of opportunities for value creation. While such a product agnostic characterization of digital resources has been noted in prior research (e.g. Kallinikos, Aaltonen, & Marton, 2013; Yoo et al., 2010), perhaps we have been less attentive to it when articulating our models and theories in digital innovation research.

Second, Henfridsson and colleagues adopt a recombination lens and advance the notion of *value path* (and *value channeling*) that reflects establishing connections between different digital resources to derive (deliver) value. The concept of value path thus builds on the product agnostic nature of digital resources and offers a more concrete way to articulate the different ways of creating value. The authors also differentiate between such digital resource recombination in design and in use. While I have some reservations on this (more on this below), the notion of value path as a construct could be quite useful in identifying, comparing and evaluating alternate value creation opportunities or possibilities in a given context. Also valuable is the discussion about path channeling as it could potentially inform on the strategies adopted by platform leaders to build and grow their platforms.

More broadly, I view the value spaces framework proposed here as contributing to the development of a shared vocabulary and a common focus for digital innovation research. In a constructive academic spirit, I also take this opportunity to comment on certain aspects of Henfridsson et al.'s framework on which I hold divergent views. I frame these more critical comments in terms of choices in perspectives related to ecosystems, actors, and value creation/capture. I hope these critical comments together with the arguments offered by Henfridsson et al. would help advance research on digital innovation in fruitful ways.

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2. From architecture perspective to ecosystem perspective

In their article, Henfridsson and colleagues have by and large adopted an architectural perspective. Specifically, digital resources (or digital components) are defined as the primary unit of analysis and the value space is conceptualized in terms of the four layers of the digital architecture (drawing on earlier work on layered architecture). While such an architectural perspective is eminently useful in understanding the role of (digital) resources and their connections in value creation and capture, it may also preclude us from developing a richer understanding of the complex and dynamic role of agency and governance in digital innovation. The authors have incorporated a partial focus on process (actors, recombination and channeling) in their model. Despite that, I suggest that the architectural perspective adopted here could potentially lead us astray in three important ways. In the rest of this essay, I describe these three issues and then suggest an alternate approach that would be less constraining but yet allow building on the authors' work here.

First, I believe the architectural perspective (as adopted by the authors) brings about an artificial distinction between design (recombination) and use (recombination). As Vargo and Lusch (2004) have eloquently articulated in their classic paper on the service-dominant (S-D) logic, the duality between producer and consumer is a byproduct of our product-centric view of the world. Henfridsson and colleagues rightly point out that such a focus on product takes us away from the openness and the generativity afforded by digital resources and the consequent potential to recombine resources to innovate by diverse sets of actors at different points in time (i.e. across space and time). At the same time, their focus on design and use seems to be again an artifact of the above producer-consumer duality. How does one distinguish between 'design' and 'use' (or, between a 'designer' and a 'user') in digital innovation? Is it based on resource ownership, the nature of engagement, the temporal characteristics, or the nature of the context? Each of these dimensions could potentially lead to different interpretations. The authors conceptualize use recombination and design recombination in terms of generating a value path by connecting different digital resources, albeit whereas the former relates to one carried out in a use context, the latter relates to one made as an 'offer' to other users (which involves monetization). However, such a differentiation potentially dissolves when actors' motives for recombination include creating value both for their own use as well as others'. In other words, a more dynamic perspective of actors is missing in the architectural perspective—one in which individual actors can be both designers and users simultaneously, rendering the boundaries between design and use more diffused.

Second, the recombination lens also implies the potential significance of agency—for example, the motives, capabilities, relationships and interactions of actors—that an architectural perspective affords less prominence to. Arguably, this leads to a less complete conceptualization of both 'value path' and 'value channeling'. Specifically, from an architectural perspective, digital innovation is largely framed as a function of technological affordances (of digital resources). Other dimensions of the context of recombination (for example, economic choices made by other actors) could play an equally significant role in shaping the nature of both value path and value channeling. Incorporating such non-technological affordances may call for a broader perspective, one that is not limited by the digital architecture. On a related note, when we use terms such as 'value path' and 'value channeling', it behooves us to bring more clarity to the notion of 'value'. An approach that incorporates agency as a central theme could help bring such needed clarity in conceptualizing 'value path' and 'value channeling'.

Third, a critical theme in digital innovation research has been the evolution of digital artifacts, infrastructure and platforms, the factors that shape such evolution, and how such evolution leads to new innovation and entrepreneurial possibilities. Although the authors justify their focus on digital resources as the starting point based on research-pragmatic considerations, I would propose that actors and the broader social and institutional/market contexts are necessary ingredients in developing an understanding of the complex trajectories of digital innovation. As such, an architectural (or artifact-centered) perspective may arguably be of limited value (or even misleading) in understanding the evolutionary process (even if it is more amenable to empirical work). A broader perspective that gives more credence to the changing nature of actors' motivations and behavior (as well as to other socio-institutional dynamics) in conjunction with dynamics associated with the nature and structure of digital resources may offer a more promising approach to investigating the evolution of digital innovations.

Given the above issues, I believe, 'value space' as conceptualized here from an architectural (or artifact-centered) perspective is limiting or incomplete. On the other hand, a broader framing—from the perspective of the digital ecosystem—could allow for a more comprehensive interpretation of value spaces and related elements, and potentially lead to a richer set of theoretical insights on value creation and capture in digital innovation. An elaborate demonstration of the promise and potential of such an ecosystem perspective is beyond the scope of this commentary. As such, here, I limit the discussion to a brief consideration of the ways by which such an ecosystem perspective could build on the authors' key concepts and at the same time help address the three issues highlighted previously.

Recent studies (for example, Adner, 2017; Autio & Thomas, 2014; Jacobides, Cennamo, & Gawer, 2018; Teece, 2014) have helped to bring more clarity to the ecosystem construct and its implications. Drawing on these and other studies, for discussion purposes here, we will consider an ecosystem as comprising of sets of actors who play different roles (that reflect complementarities) with the ensuing interdependencies in their activities and outcomes. From such a perspective, the design-use divide becomes less important than who is involved (and why they are involved) in value creation (and capture) through the recombination of digital resources. Specifically, it sharpens the focus on *actors* (their motives and behaviors), and importantly, on the connections between those actors and the resources at the time of their involvement in recombination (rather than on whether those actors fall on the production or consumption side). This approach also aligns well with the notion of resource integration as articulated in the service innovation literature (for example, Lusch & Nambisan, 2015) that eschews the producer-consumer dyadic and instead anchors it on the behaviors of actors. Given that these motivations and behaviors are dynamic, the ecosystem perspective also allows us to examine how actors' connections with digital resources may change over time, and how this may, in turn, lead to preferential treatments given to

particular digital resources in recombination decisions.

An ecosystem perspective also brings the focus on the alignment among varied sets of actors (Adner, 2017) and thereby on their cooperative or collaborative behaviors (to pursue a focal value proposition). I believe, from such a perspective, value path may be re-conceptualized in terms of both digital resources (characteristics) and actors (goals). Such a reconceptualization may help in two important ways. First, it could help bring greater clarity to the notion of 'value' in 'value path'—who assigns value and how is such value perceived? In other words, it would allow us to interpret 'value' in digital innovation by considering *both* digital resources and actors, rather than at the digital resources level alone (as in the authors' current framework). Second, it could facilitate careful consideration and incorporation of the socio-institutional factors that facilitate (or constrain) value paths.

Importantly, the ecosystem perspective may also allow for a refined understanding of the evolution of value spaces as conceptualized here. For example, it could allow us to examine how changes at the digital resource level together with those at the actor (or institutional) level shape the evolution of different 'value spaces' (and, the value paths within them). It could also potentially lead to a richer interpretation of some of the other concepts in the authors' value spaces framework, including path channeling.

As noted at the beginning of this essay, there is a vibrant interdisciplinary research dialogue ongoing on digital innovation. While such theoretical diversity is quite beneficial, it is equally important to have a shared vocabulary and grammar as we study digital innovation. I consider the authors' value spaces framework and the ideas therein as a potential step at building such a shared language. At the same time, I believe that an architectural perspective or an artifact-centered approach is likely to be too constraining. A broader perspective, one that draws on the rich and rapidly growing literature on ecosystems, may instead allow us to give *both digital resources (artifacts) and actors (agency) their rightful central place* in our examination of digital innovation.

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